CarouselUSA

From:
Carousel USA
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To:
Name:
Company:
Address:
Email:

MC3 Controller Outline

Contents

1. Introduction

This document is intended to further detail the Motion Control 3 turntable controller equipment described in the contractual agreement. It will cover functionality and provides step-by-step standard operating procedures.

a. Content of Carousel USA Agreement

CUSA Motion Control System MC-3, CW/CCW, UL 508A approved.

b. System Features

- User can rotate the table using the front panel controls or included software.
- Software will give the ability to have full control of the table, including relative and absolute moves, and camera integration.
- Camera will be integrated into ShutterStream, the included software, with batch edit and saving functionality to make streamlining car photography much easier.

c. Components

Enclosure:	WM201608NC	Rittal Enclosure 20"x16"x8"
VFD:	22F-A8P0N103	PowerFlex 4M 180V-264V 2.0hp 1Φ input
Encoder:	IG12P	Nord Quadrature Encoder
Circuit Breaker:	L9-15/2/D	Sprecher+ Schuh Circuit breaker, AC, 15A 2-pole
	L9-3/2/D	Sprecher+ Schuh Circuit breaker, AC, 3A 2-pole
Switches:	LB1L-M1T54R	IDEC Red LED push button
	LB1L-M1T54G	IDEC Green LED push button
	800FD-SB32X20	Allen Bradley 3 Pos. Switch - Spring Return
	OXS6X180	ABB 180mm Disconnect Shaft
	OHYS2AJ	ABB On/Off Switch Handle
	OT16F3	ABB Disconnect Switch
	800FP-MT44	Non-Illuminated E-stop Mushroom Button, Twist to Release

2. Control Panel

a. Specification

- Wall Mounted H19.69” x W15.75” x D8.27”
- Light Gray Powder-coated Steel
- Preferably located in proximity to turntable motor drive (in "pit")

b. Connections

- Incoming Power
  - Voltage: 208-240v 1Φ
  - Required Amperage: 15A
- Conduit to motor pit

- Motor Horsepower: 1.5hp, 240v, 3Φ

c. Features and Function

1) 1X 22mm - CW/CCW Spring return to center selector switch
   Clockwise or counterclockwise selector switch allows turning the table manually. Table will stop when the switch is released.

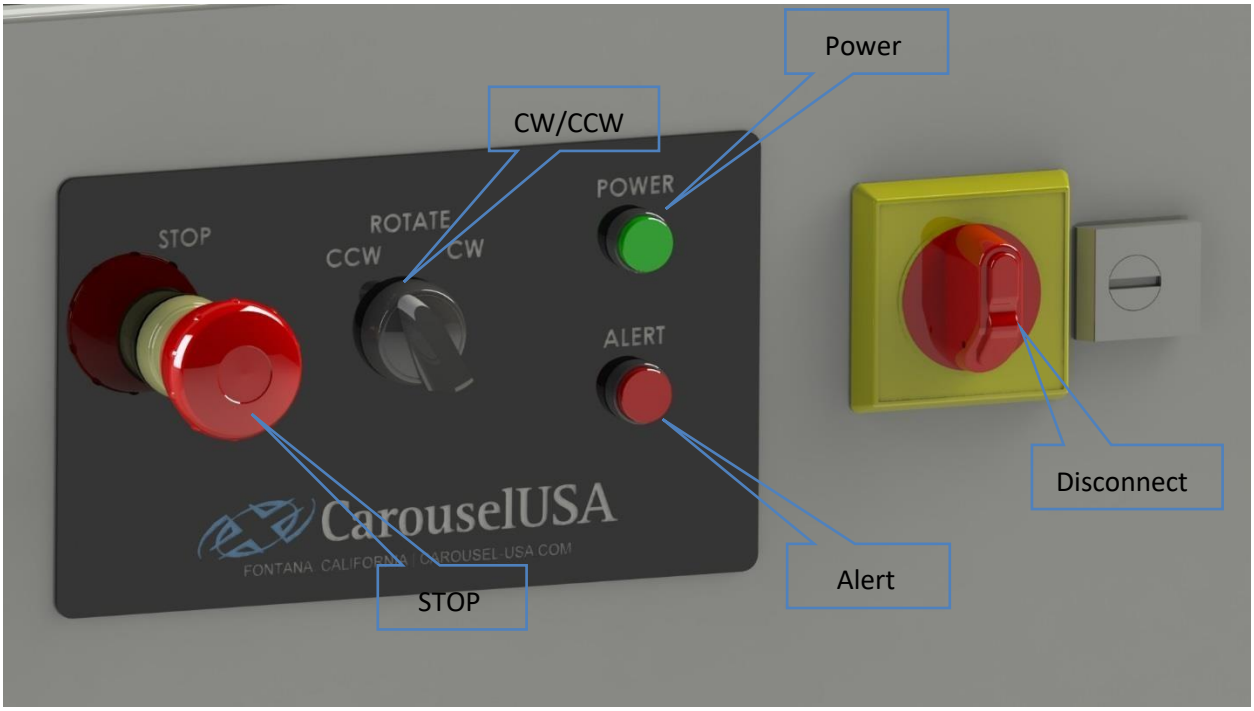
2) 22mm - Green Run Indicator
   Illuminates when table is in motion.

3) 22mm - Red Fault Indicator
   Illuminates when the control box has a fault.

4) Emergency Stop
   Pulls power from the VFD when pressed.

5) On/Off Power Disconnect
   (Not shown) Removes all power to the control panel.

d. Overview



3. Standard Operating Procedure

a. Entering/Exiting the turntable

1) The operator will pull the vehicle onto the turntable.
2) Operator will exit the vehicle and use the front panel controls to turn the table in the intended direction.
3) To exit the turntable, the operator will get back into the vehicle and either reverse or pull forward off the turntable.

b. Taking photographs of vehicles

1) The operator will pull the vehicle onto the turntable.
2) Operator will exit the vehicle and use the included software to start the camera program. The turntable will do a full 360° rotation, taking pictures at the preset degree positions. Once the camera program is completed, the table will stop. Picture saving and edits would also be done at this point.
3) Operator will then use the software to rotate the turntable, so the vehicle faces the exit, then get back into the vehicle and exit the table.

CarouselUSA

MC3 Motion Control System

MC3 CONTROL BOX MANUAL

Revised 12/28/22

Carousel USA
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Table of Contents

1. Control Box Description

The MC3 controls box stands for Motion Control Revision 3. The MC3 includes a programmable logic controller (PLC), which provides customizability of turntable controls.

Control capabilities of the MC3 includes, but not limited to; clockwise/counterclockwise control, wireless control, 3rd party application control utilizing client/server Modbus configuration, addition of control components such as selector switches and push buttons, and much more. Please contact our sales department for additional information on the MC3 and customized options.

2. Installation Requirements

As an OEM, Carousel USA is responsible for the installation of our equipment only and cannot perform electrical work during our installation process.

A. Power and Control Requirements, Provided by Others.

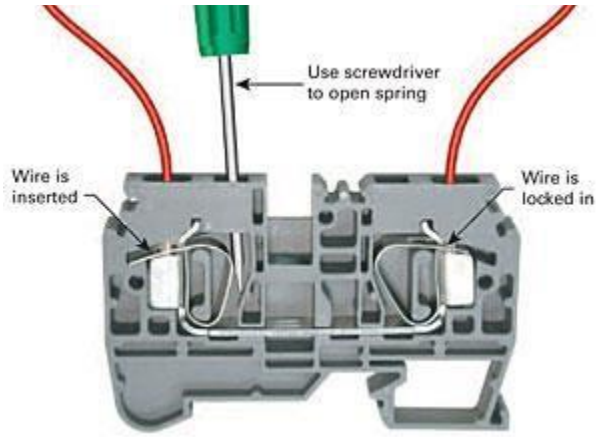
MC3 Installation requires a minimum of three (3) conduits:

1. One (1) conduit for power to the control box.
2. One (1) conduit for power from the control box to the motor.
3. One (1) conduit for encoder signal from the control box to the motor.
4. Additional conduit(s) may be required for custom applications.

Electrician responsibilities includes the following tasks:

1. Mounting the MC3 enclosure to the wall.
2. Provide power to the control box, including penetration of enclosure. Typical power requirements to the control box is a single-phase, 230 volts circuit, with minimum ampacity of 8 amps. 2 wires + ground.
3. Provide conduit and wire to motor from control box. Typical motor requirements are than 1.5HP motor, 3-phase, 230 volts, 4.2 amps. 3 wires + ground.
4. Provide conduit and cable to motor for signal (encoder). Typical encoder cable requirements include a five (4) conductor cable, minimum #18 AWG. Signal characteristics is a 24VDC, 50mA Signal. A multiple conductor data cable has been proven to provide best performance; shielding is typically not required but may provide beneficial signal protection.
5. Fish the power wire from the enclosure to the turntable motor.
6. Land the power wires onto the terminal blocks or VFD in the control box.
7. Land the power wires onto the motor leads ensuring that the motor is wired for the appropriate voltage operation.
8. Fish the signal cable from the MC3 enclosure to the gray plastic junction box in the turntable pit. Supply 1/2" trade size cord grip as needed.
9. Land the signal wires into the MC3 enclosure and the junction box. The details that follow, and/or our technician can help identify the appropriate positions.

The MC3 enclosure uses spring clamp terminal blocks. These require the use of a small flathead screwdriver to land the signal wires. See the illustration below.



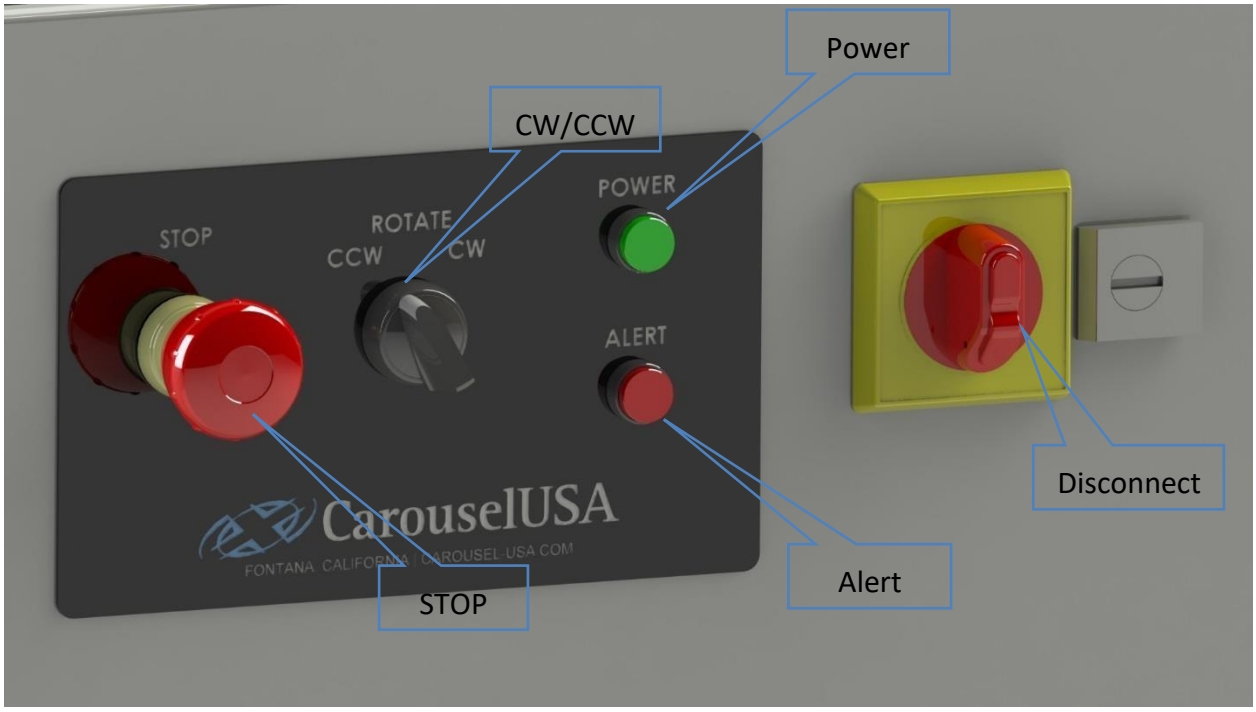
2. MC3 External Layout

The following is a typical layout and function of devices located on the door of a standard MC3 control box. The electronic equipment that drives the standard MC3 system is mounted in a light gray powder coated steel enclosure.

A. Basic Operation

Use the **CCW/CW** switch to move the turntable as desired.

B. Front Panel Interface



iii. Lockable Disconnect

The MC3 enclosure features a disconnect switch with multiple features.

- When it is set to the ON position, the panel is powered up and the enclosure cannot be opened.
- Or if set to the off position, the switch features a tab that can be pulled out which prevents the enclosure from opening. A padlock can be inserted through the tab to prevent users from activating the switch as well. If the tab is pushed back in the enclosure can be opened freely.
- **CAUTION, the following to be performed by authorized personnel only:** To circumvent this mechanical interlock and power up the system with the door open (Often necessary when troubleshooting), turn the system off, open the enclosure then use fingers or a tool to carefully switch the oval shaped disconnect on.

iv. Power

The device labeled power functions as both an indicator light and a pushbutton.

Illuminating Solid: The green power light illuminates solid when the low voltage system is reporting power and is booted up.

Slow Blink: The indicator will blink when the turntable is in motion.

Pushbutton: Serves as a "shift" key to alter other commands. Specifics of use are defined in the command button sections below.

v. Alert

Solid: The red alert light will illuminate solid when there is a communication fault with the VFD. Contact Carousel USA if this problem occurs.

Slow blink: VFD FAULT A slow blink indicates that the VFD has experienced a fault. This may range from insignificant to a severe problem. Contact Carousel USA if a fault is persistent and prevents proper use of the equipment. Resetting a fault is covered in the JOG command section below.

Fast blink: E-STOP ENGAGED A fast blink indicates that the E-Stop is engaged. Reset the E-Stop by twisting it clockwise and pulling out.

Pushbutton: **STOP** A momentary push of this button will trigger a stop command. The turntable will decelerate to a stop. Other than using the PC based controls, this is the preferred way to stop the turntable if there is unintended movement.

This key also serves as a "shift" key to alter other commands. Specifics of use are defined in the command button sections below.

vi. Mushroom Stop Button

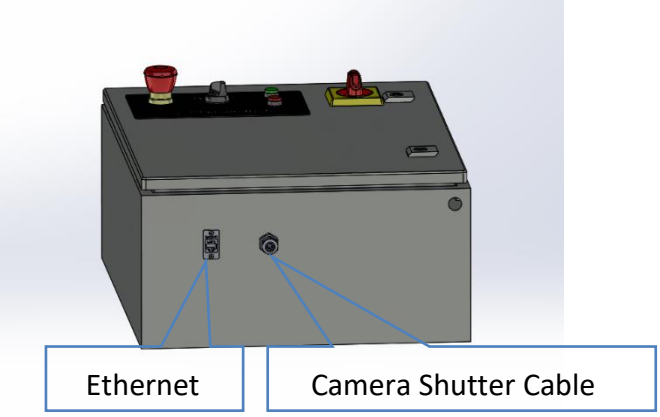
The Mushroom stop button is meant to be used in a more severe stopping situation where the table should stop immediately. For "everyday" stopping, either use the digital PC controller or push the "Alert" button on the panel.

vii. CW/CCW Switch

The jog switch is a momentary spring-to-center 3-position selector switch. When in the vertical position the switch is not sending any commands to the controller. If rocked into the CW or CCW position, the table will accelerate to a preset jog speed then decelerate to a stop when released.

C. Ethernet and Camera Ports

After the electrician finishes punch outs and wiring the enclosure there will be several other conduits (Incoming power, outgoing motor, outgoing data). However, the enclosure will ship with two ports already located on the bottom.



viii. Ethernet

The ethernet port allows for communication between a PC or MAC and the MC3 system. The ideal setup is to plug the enclosure into an existing network that the operating computer has already joined (via ethernet cable or Wi-Fi). The network connection is hardwired and will operate using cat 5e cable (or better).

An IT professional may be able to use a typical off-the-shelf **network bridge** to connect the MC3 wirelessly to the network, however the setup for such a system is outside of the scope or support that Carousel USA offers.

ix. Camera Shutter Cable (Photography installations)

The slim black cable features a Female 2.5mm jack. A connector will plug into the jack and allow the MC3 system to control the shutter release of the camera.

Note: *Full details for camera setup and use are included in the CUSA360 User Manual.*

3. MC3 Internal Layout

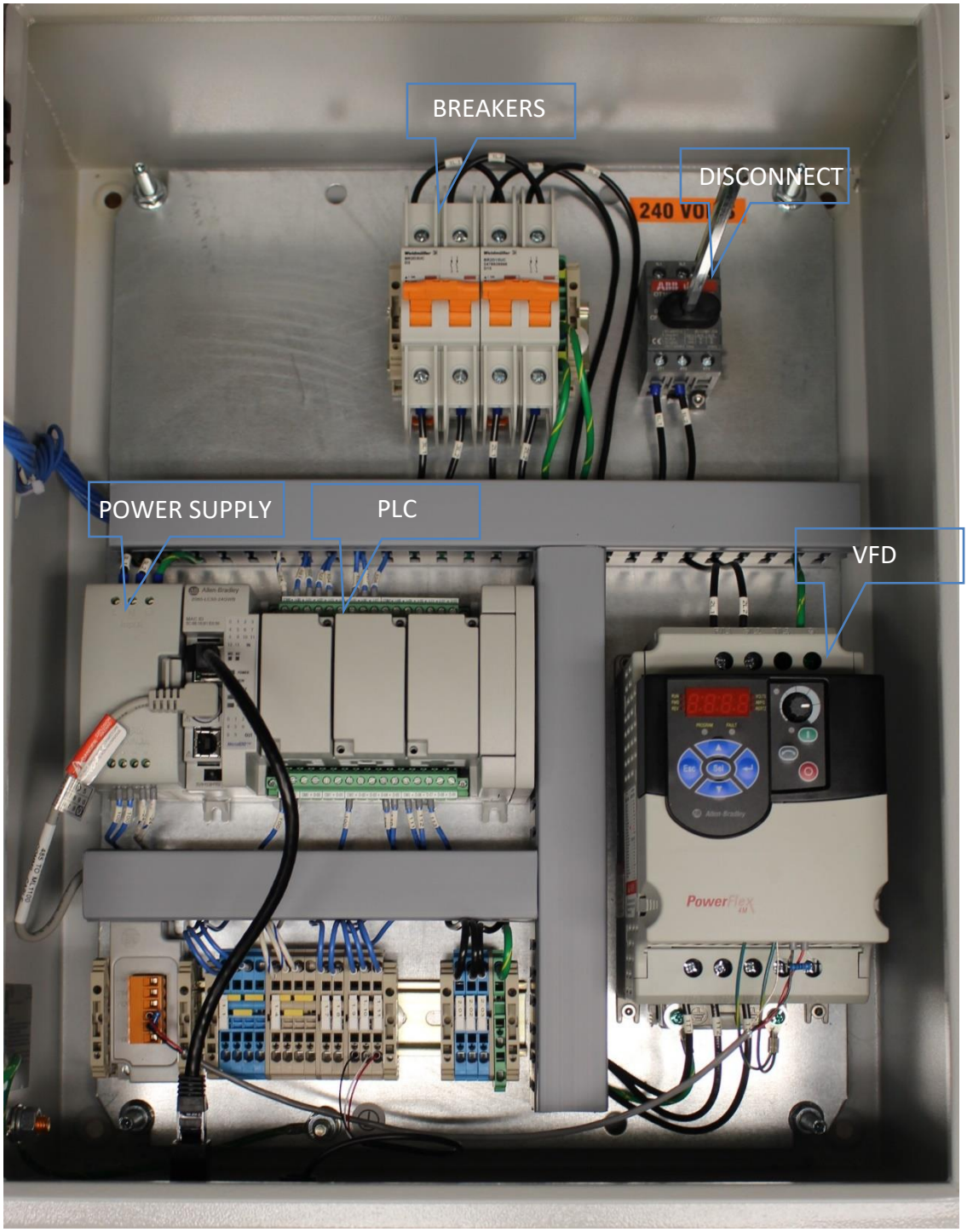
WARNING: OPENING THE CONTROL PANEL EXPOSES LIVE WIRING. ANY WORK PERFORMED INSIDE THE CONTROL PANEL IS DONE AT THE USER'S OWN RISK. TO PREVENT ELECTRICAL SHOCK, USE CAUTION WHENEVER WORKING NEAR EXPOSED WIRING OR CONNECTIONS.

A. Accessing Internal Components

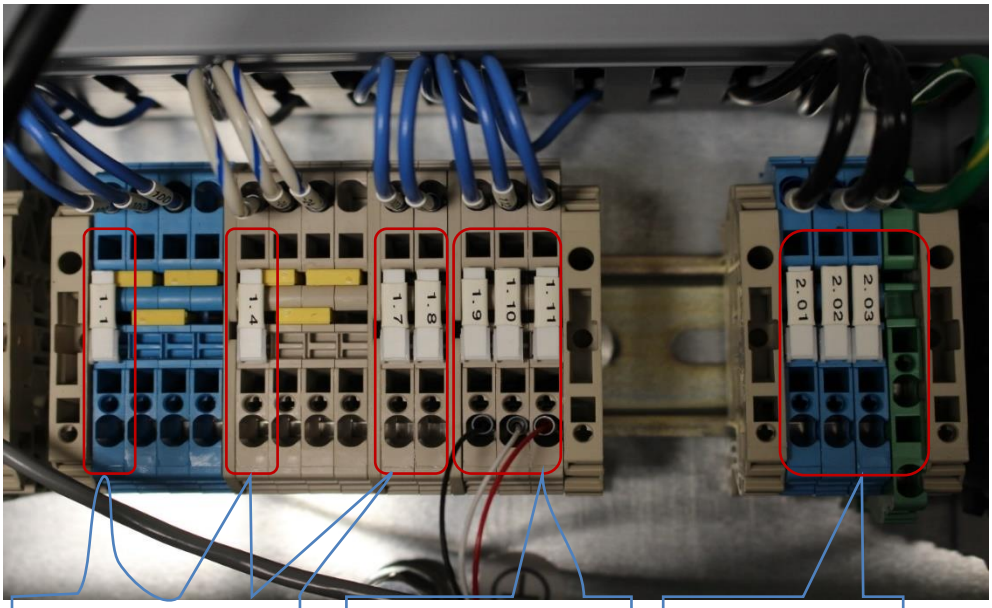
1. Turn Off Main Power

2. Open Control Panel using a flat blade screwdriver

B. MC3 Internal Layout

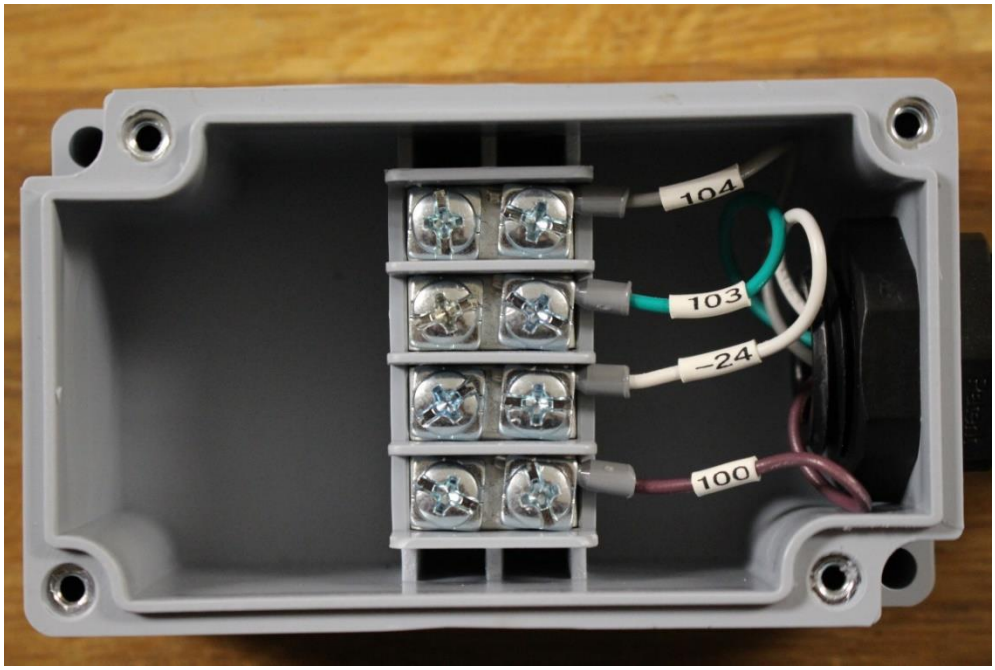


C. Field Terminals Layout

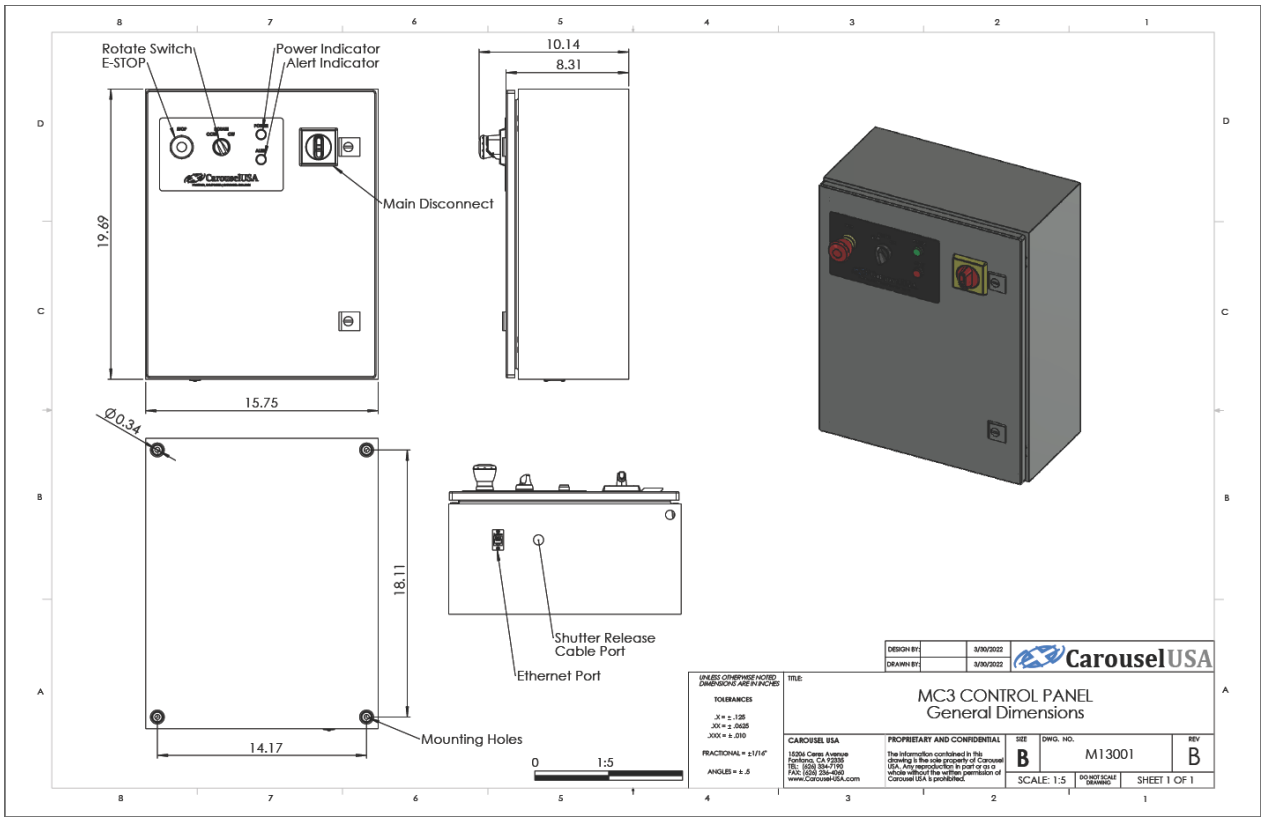


4. Encoder Junction Box

A representation of the terminal blocks inside the junction box is illustrated below for reference by relevant parties. Pay special note to the colors of the wires to determine proper wiring.



5. Control Box Dimensional Drawing



CarouselUSA

Motion Control Turntable

Troubleshooting Guide

Revised 1/15/2024

Carousel USA
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1. Introduction

This manual provides a step-by-step guide to troubleshooting simple issues related to the Carousel-USA Standard Turntable Controller.

CONTENTS

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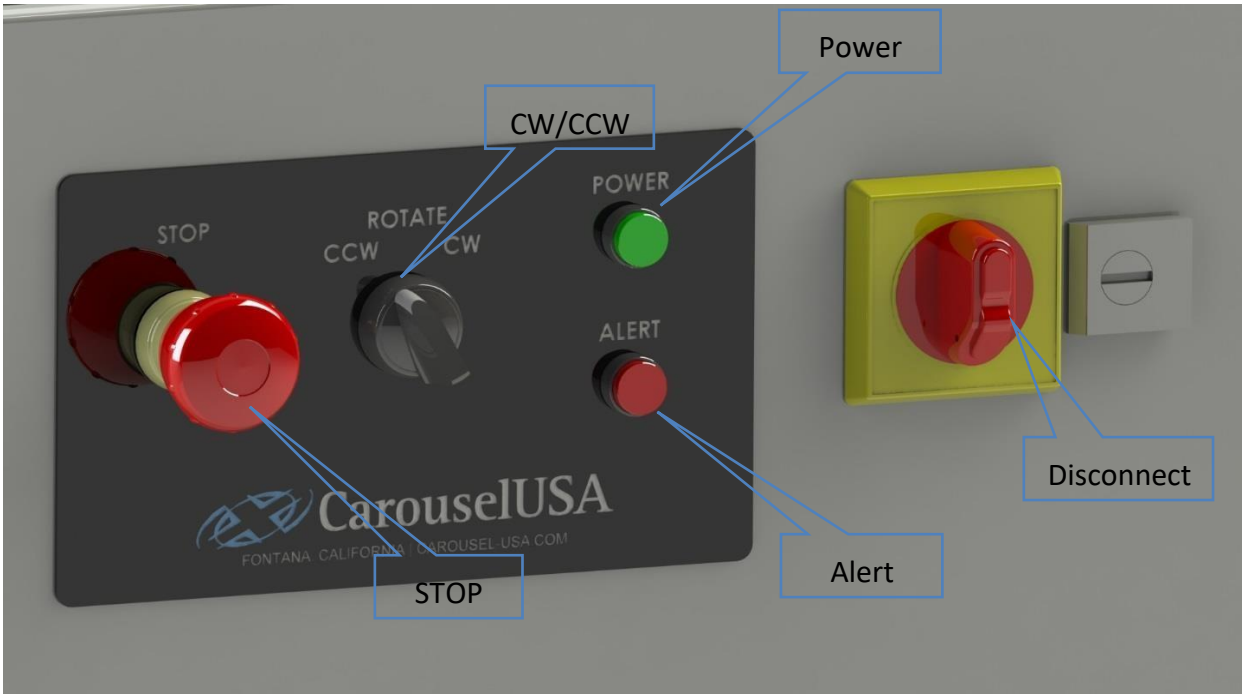
2. Inspect Operational Area

Create a clear and free working area around the turntable, ensuring that there is no debris that could cause interference with the turntable while in motion and that no one would be endangered by sudden movement of the turntable at any time while troubleshooting.

3. Checking The Panel E-stop



Before opening the control panel, inspect the Red Mushroom E-stop Module on the left side of the panel, and ensure that it is not pressed in. If it is, twist the red part of the module clockwise to reset it, and attempt to use the controls to operate the table again. If the table still does not operate proceed, to the next step to open the control panel.

4. Opening the Control Box

A. Turn Off Main Power

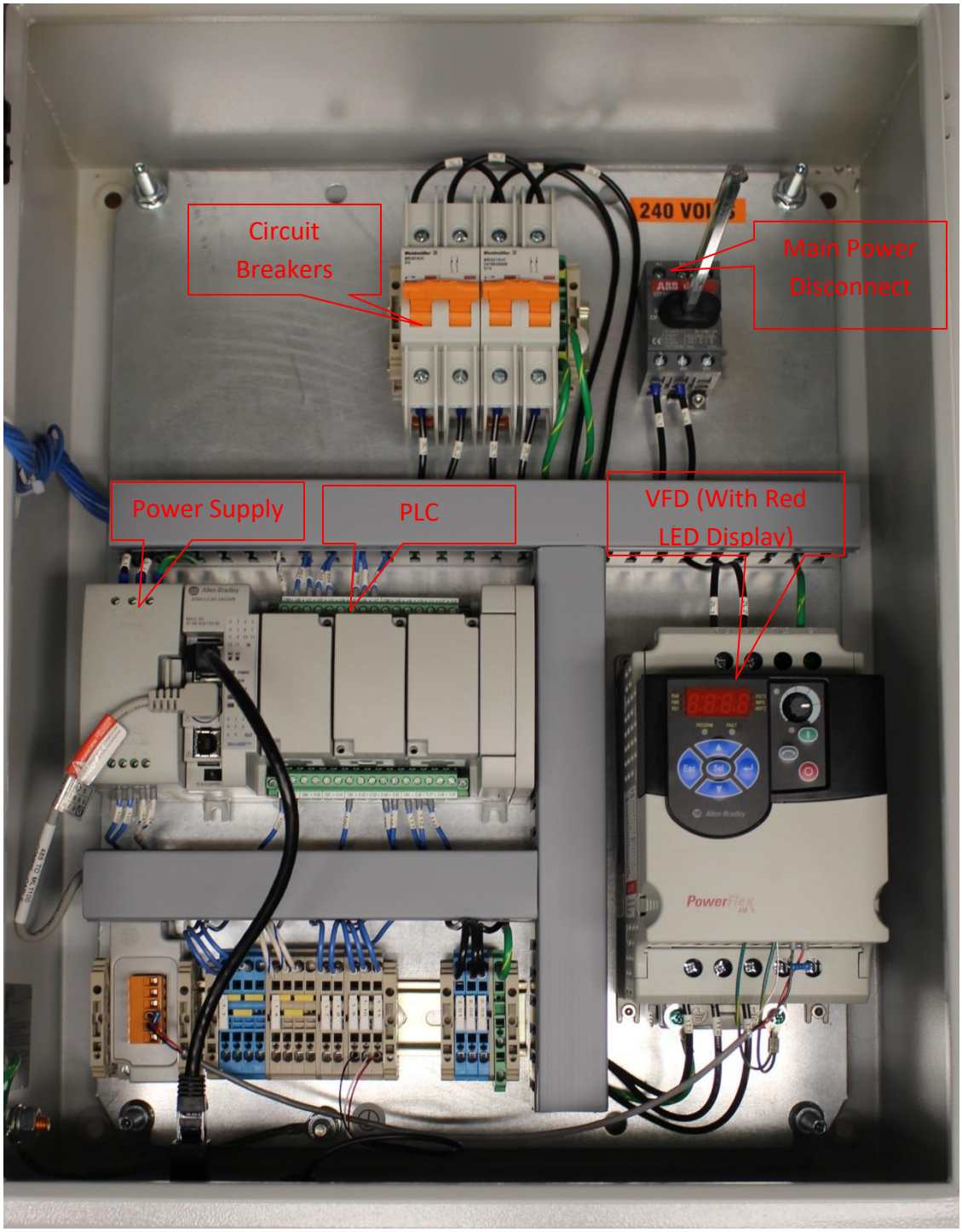
Turn the Main Disconnect Switch on the front of the control box to power off the unit. Then, using a large, flathead screwdriver, rotate the key-hole a quarter turn counter-clockwise to unlatch the door, and open the control box.

WARNING

OPENING THE CONTROL BOX EXPOSES LIVE WIRING. ANY WORK PERFORMED INSIDE THE CONTROL BOX IS DONE AT THE USER'S OWN RISK. TO PREVENT ELECTRICAL SHOCK USE CAUTION WHENEVER WORKING NEAR EXPOSED WIRING OR CONNECTIONS.

B. Turn on Main Power with Door Open

With the door still open, return power to the control box by twisting the disconnect shaft a quarter turn clockwise. If the red LED VFD display shown below lights up, skip to Section 6 Check for VFD Fault.



5. Check Circuit Breakers

A. Reset Circuit Breakers

If the orange tabs on the circuit breaker have been flipped down, reset them by pushing them back up into the position displayed below. If they are forced down again, the fault condition is still present. Call Carousel-USA at (626)334-7190 and ask for electrical troubleshooting assistance.

Circuit Breaker

6. Check for VFD Fault

A. Clear VFD Faults

On the VFD, if the LED light labeled "FAULT" is lit, press the VFD Fault Reset Button pictured below. If the fault is still present, check the table below to determine what is causing the fault, and next steps to take to correct the fault. If there is no fault present but the table is still not fully operational, skip to Section 10 Controls Testing.

VFD Fault Reset Button

*****DISCLAIMER*****

Before performing any work involving removing wire from terminals, ensure that power is turned off and proper precautions are taken to avoid electrical shock. If ever unsure about how to proceed, please email Carousel-USA at support@carousel-usa.com and provide a brief description of the issue as well as pictures inside the control box or call Carousel-USA at (626)334-7190 and request electrical troubleshooting assistance for a live diagnostic.

7. VFD Faults Table

Displayed Fault Code	Fault	Description	Next Steps
F003	Power Loss	Excessive DC Bus voltage ripple	Check incoming line for phase loss or line imbalance
F004	Under Voltage	DC bus voltage fell below the minimum value	Check incoming line for low voltage or line power interruption. Fault will also appear briefly whenever the control box is powered down via circuit breaker or main disconnect switch
F005	Over Voltage	DC bus voltage exceeded maximum value	Check incoming line for high voltage or transient conditions
F006	Motor Stalled	Drive is unable to accelerate motor	Ensure that VFD parameter P109 is set to 3.0 (See VFD Parameters Section)

F007	Motor Overload	Internal electronic overload trip	Ensure that VFD parameter P103 is set to 4.2 (See VFD Parameters Section)
F008	Heatsink Over Temperature	Heatsink Temperature exceeds a predefined value	Check for blocked or dirty heatsink fins or cooling fan on the VFD. If ambient temperature is below 40°C (104°F) VFD may need replacing
F012	Hardware Over Current	The drive output current has exceeded the hardware current limit	Ensure total load on turntable does not exceed rating for your model
F013	Ground Fault	A current path to earth ground has been detected at one or more of the drive output terminals	Check the motor and external wiring to the drive output terminals for a grounded condition
F038	Phase U to Ground	A phase to ground fault has been detected between the drive and the motor in this phase	Check the wiring between the drive and the motor, check the motor for grounded phase, and replace drive if fault cannot be cleared
F039	Phase V to Ground		
F040	Phase W to Ground		
F041	Phase UV Short	Excessive current has been detected between these two output terminals	Check the motor and drive output terminal wiring for a shorted condition, and replace drive if fault cannot be cleared
F042	Phase UW Short		
F043	Phase VW Short		

F048	Parameters Defaulted	The drive was commanded to write factory default values to all parameters	**IMPORTANT** **See VFD Parameters Section to set parameters before operating turntable. Failure to do so may result in damaged components**
F064	Drive Overload	Drive rating of 150% for 1 minute or 200% for 3 seconds has been exceeded	Ensure total load on turntable does not exceed rating for your model
F070	Power Unit	Failure has been detected in the drive power section	Cycle power and replace drive if fault cannot be cleared
F100	Parameter Checksum	The checksum read from the board does not match the checksum calculated	Set VFD parameter P112 to 1 (See VFD Parameters Section) to reset parameters to factory defaults **IMPORTANT** **See VFD Parameters Section to set parameters before operating turntable. Failure to do so may result in damaged components**

8. VFD Navigation

On power-up, the VFD display will show 0.0 Hz, indicating that the turntable is not moving. Hit enter, and the display will change to show one flashing letter and three solid numbers indicating that the up and down arrows will change the letter. Hitting enter will allow you to change the numbers rather than the letter, and hitting escape will bring you back to 0.0 Hz. Navigate to the parameter you need and hit enter again to view the value currently set to that parameter. This can be changed if needed by using the arrow keys and will be saved once the escape button is pressed, however, you must only change these values if instructed to do so as it may cause damage to the turntable if changed incorrectly.

9. VFD Parameters

Stop ALL turntable movement before changing parameters

A. Factory Default Parameters

If you believe the issue is being caused by parameters in the VFD, begin by factory resetting the parameters. This can be done by setting the value of parameter P041 to 1, however, keep in mind that the parameters listed in the next section will need to be set again to operate the turntable without possible damaging of components.

B. Parameters Set by Carousel-USA

The following are parameters set by Carousel-USA, all others should be set at the factory default. Use these as a guide on which parameters need to be changed if the VFD gets set back to a factory default state (via parameter P041 or P112 being set to 1, or an F048 fault occuring):

P103 (Motor Overload Current): 4.2A

P104 (Minimum Frequency): 15.0 Hz

P105 (Maximum Frequency): 60 Hz

P106 (Start Source): 5 (Communications)

P107 (Stop Mode): 0 (Coast)

P108 (Speed Reference): 5 (Communications)

P109 (Acceleration Time): 3.0 seconds

P110 (Deceleration Time): 2.5 seconds

C302 (Communication Data Rate): 3 (9600)

C303 (Communication Node Address): 100

C306 (Communications Format): 0 (8-N-1)

C. Diagnostic Parameters

The following parameters are used in troubleshooting to determine important control values and cannot be changed.

Parameter Number	**Parameter Name**	**Description**
d001	Output Frequency	Frequency present at VFD to motor terminals
d002	Commanded Frequency	Frequency the VFD is attempting to achieve
d003	Output Current	Current present at VFD to motor terminals

d004	Output Voltage	Voltage present at VFD to motor terminals
d006	Drive Status	First number represents deceleration (1 = true 0 = false), second number represents acceleration (1 = true 0 = false), third number represents forward or reverse (1 = forward 0 = reverse), and fourth number represents running or stopped (1 = running 0 = stopped)
d007, d008, and d009	Fault Codes	Displays recent fault codes with d007 being the most recent fault and d009 being third most recent fault
d013	Control Input Status	Displays whether the VFD is being told to stop (second number, 0 = stop command), run in reverse (third number, 1 = run reverse command), or run forward (fourth number, 1 = run forward command)

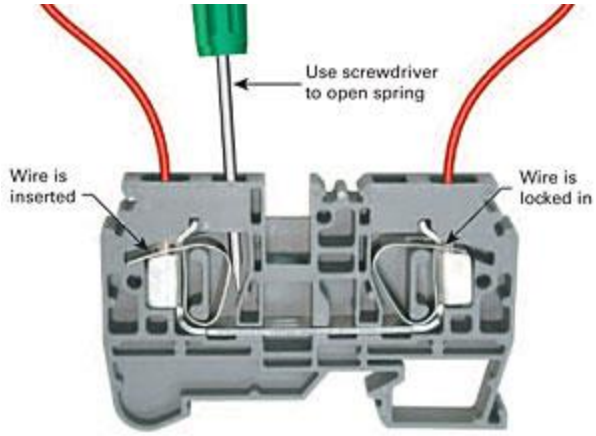
10.Controls Testing

A. Test All Control Inputs

Begin by attempting to move the turntable in both directions using the selector switch on the control panel door as well as on the Carousel-USA web app. Take note which of these moves the table and in what direction. Also note if any of these control inputs do not move the table but make an audible noise from the motor and avoid retesting these until the problem has been identified and rectified.

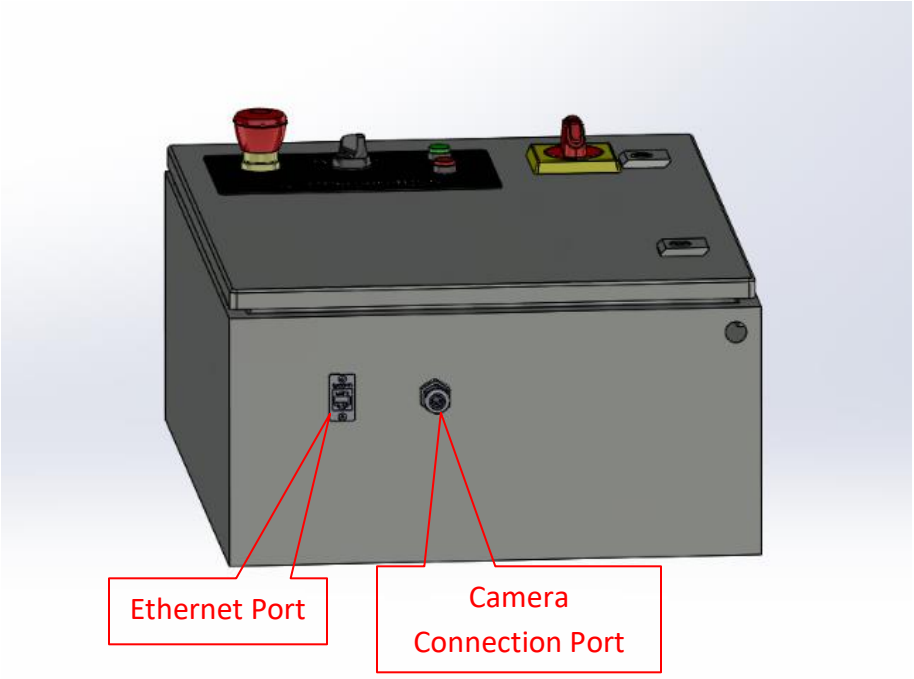
B. Check Connections

If the selector switch on the control panel door did not operate the turntable, inspect the wiring connected to the back of the selector switch on the door for loose connections or damaged wiring. Additionally, inspect the wires with the same numbered tags as the selector switch connections in the terminal blocks at the bottom of the control panel for loose connections or damaged wiring. Should any of the terminal blocks have loose connections, you will need a small flathead screwdriver to reinsert the wire as shown below.



Use a small flathead screwdriver to pry the terminal towards the wire insert to release clamps and pull screwdriver out to re-clamp wire

If the selector switch does operate the turntable, but the Carousel-USA web app does not, inspect the ethernet cable running from the PLC to the ethernet port mounted to the bottom of the control panel and the connection from the bottom of the control panel to your network. If the connection seems secure, skip to the section titled Carousel-USA Web App to continue troubleshooting.



11. CUSA360

*****NOTE*****

CUSA360 is now legacy software and will no longer be supported with updates. Carousel-USA now offers a web-based application for all Motion Control commands. Please contact Carousel-USA if you wish to set up a new Carousel-USA Web App Account

*****NOTE*****

A. Networking

i. Physical Connection

The PLC needs to be physically wired into the same network on which your controlling PC is located. Run an Ethernet cable from a switch into the port located on the outside of the controller enclosure. A third-party IT professional may be able to set up a wireless access point to serve as a bridge and connect the MC3 system to the network wirelessly.

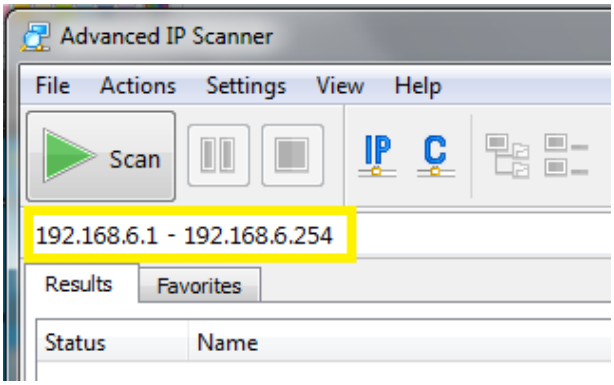
ii. IP Address

With most networks the PLC will assign itself an IP address automatically upon connection. The IP can change if there is a power loss or other server interruptions.

A third-party IT professional can set up the network to consistently assign an IP address to the PLC to help reduce the need for the following steps in the future.

To get the IP address, you will need to install the Advanced IP Scanner v2 software. The software can either be downloaded at the following address, by Googling IP Scanning software or it is located on the included USB drive. Here is the link to the software: http://www.advanced-ip-scanner.com/download.php?lng=en

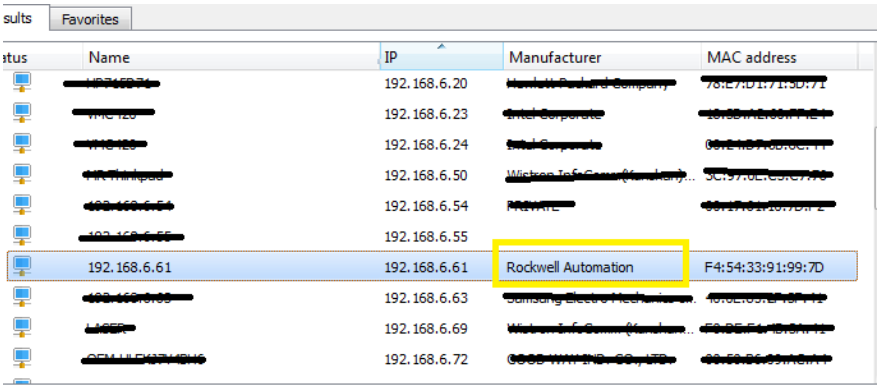
Once the Advanced IP Scanner is installed and opened, you will see the window shown below. In the highlighted yellow box, type a search range with a range from your gateway (Shown as 192.168.6.1) to a 254 in the last box.



So, for example, if your Gateway was 192.168.1.1 then your search box would read 192.168.1.1-192.168.1.254. Or, if your gateway was 72.3.156.1 then your search box should read 72.3.156.1-72.3.156.254. If you do not know your gateway, please contact your IT Administrator.

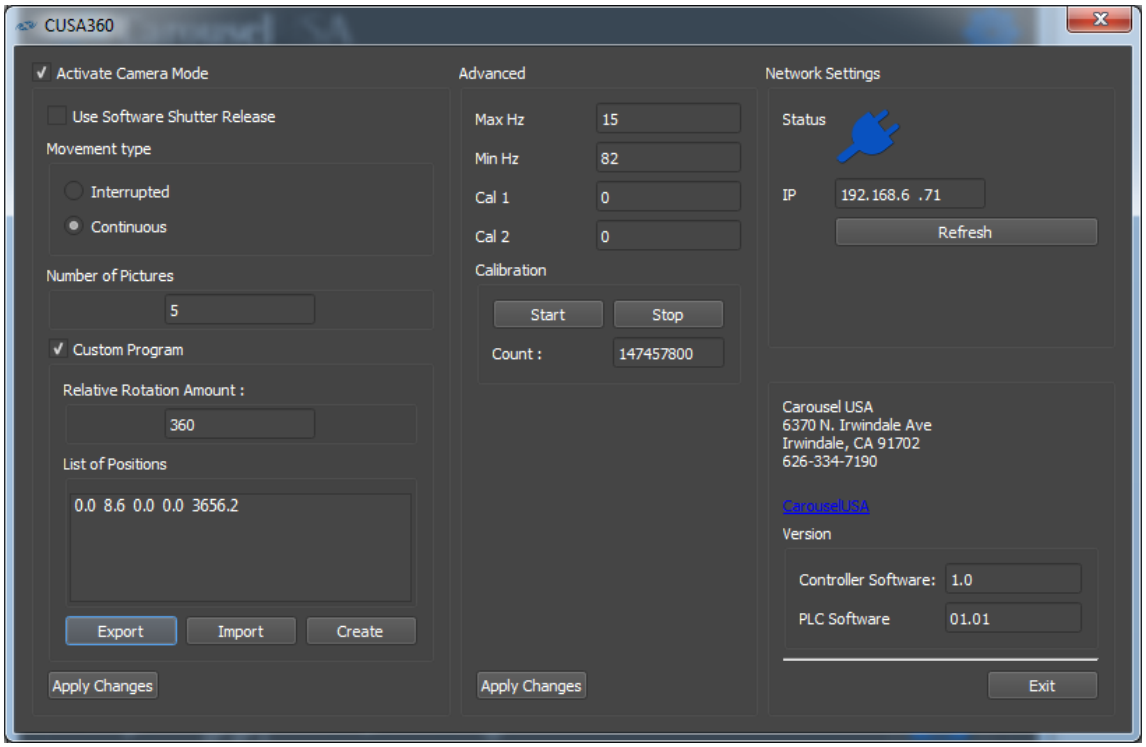
If you don't insert a range, you will not be able to do a search. If you scan every possible IP address from 1.1.1.1 to 255.255.255.255 then this process will take a very long time while you wait for thousands of possible addresses to be tested. But as long as you start at your gateway, this should search your local network. Hit Enter to perform the search.

Scroll down the list till you see a device listed with a listed Manufacturer of **Rockwell Automation**. The **IP address** listed to the left of the Manufacturer is the IP address of the Carousel USA MC-3 motion control box. Write this value into the IP address field of the first step. The line you are looking for will look like this:



B. CUSA360 Settings

The settings screen can be accessed by clicking the gear in the upper right corner.



i. Camera

Activate Camera Mode: If you do not intend to use the software for photography, deselect this option to remove the feature from the main screen.

If you have an installation where product photography is used, check that the "Activate Camera Mode" is selected and the option is active. The meaning of the rest of the settings will be discussed in the camera chapter.

ii. Advanced

These settings are to be changed by authorized users only and will be set to optimal values at installation. If you are unsure about what these settings mean, it is best to leave them alone, improper settings may damage equipment, result in poor performance and possibly void the warranty.

The Max Hz: the speed of the turntable when the speed is set to 100%. [Hz] **Default: 60**

The Min Hz: the speed of the turntable when the speed selector bar is at 0%. [Hz] **Default: 15**

Cal 1: Anticipatory angle approach [10ths of a degree]. **Default: 200**

This is the angle before the target angle at which the turntable drops to creep speed to achieve a result more accurate to the intended angle. Setting this value to 150 will result in creep initiated at 15.0° away from final destination.

Cal 2: Creep speed [Hz]. **Default: 15**

This is the speed that the turntable drops to during the creep cycle. Increasing the angle and decreasing the speed may result in more accurate angular spins.

Calibration is used to tell the turntable what 360 degrees is. Unless your turntable is not spinning remotely close to 90 or 180 degrees when each is selected, there is no need to touch these settings.

iii. Network Settings

This section provides information and allows the turntable to be connected to a computer over the network. The **Status** image indicates whether or not the turntable is connected to the control computer. The **IP** is the address of the turntable on your network. Ensure this number matches the number found in the IP Address section in this chapter.

C. *Camera Settings*

i. Software Shutter Release

The **software shutter release** function is for a-typical installations and should remain **unchecked**.

ii. Movement Type

Movement type, similarly, should remain set to **Continuous**.

iii. Number of Pictures

Number of pictures indicates the number of pictures the program will produce by the end of its completion. If you type in a number, say 20 photos, the list of positions will populate automatically. If you are using a custom program, the number of pictures will provide a reference for how many positions you have selected.

iv. Custom Program

Custom program provides additional flexibility for photographers that might want photos that are not evenly divided around the 360° spin. For these installations, the user should check the **Custom Positions** box which will activate the ability to adjust the relative rotation amount and buttons for altering the positions list.

v. Relative Rotation (Custom Programs Only)

Recommended for advanced users only: **Relative rotation** amount instructs the camera command how far the turntable should spin before the program is considered complete. If only one side of the subject needs to be photographed the user could set the relative rotation to 180° and would set the values in the list of positions to range from 0° to 179.9°

vi. List of Positions (Custom Programs Only)

Recommended for advanced users only: This is a list of custom positions. It is important that the values in the list go from smallest to largest otherwise the camera program will act erroneously. Users may input up to 399 different values, but may need to slow the table down so the camera can catch up. To save time, users may import/export text files to easily save/retrieve preset values.

D. CUSA360 Troubleshooting

i. Turntable Does Not Stop at Position Instructed

The MC3 system uses a precision encoder to report the position of the turntable. It uses this encoder to generate a very precise idea of where the turntable is located and uses this data to control the camera release. While the location accuracy of this procedure is very high, the actual "go-to" positioning of the system is not as accurate. The MC3 controller uses a induction motor and VFD for positioning. Using this combination allows for moderate precision which gives good results for moving a car around to face the other direction, and also keeps the pricing of the system competitive. Higher precision systems using servo motors and closed loop positioning programming are often used for industrial applications and can provide high accuracy but don't make economic sense for the intended use of the MC3 system. Place an item atop the table and rotate the table 360 degrees using the "Relative" command. You should expect to see the table accurate to within about 3 inches or better. If there is error in excess of this it may be indicative of a calibration problem. Contact Carousel USA if this is the case.

ii. Turntable Positioning Drifting (Zero Location Changes Over Time)

This problem is symptomatic of poor calibration results, contact Carousel USA for assistance troubleshooting and performing a calibration.

iii. Camera Program Does Not Spin Clockwise

The clockwise direction command is ignored by the camera program. This is because the photos are taken in increasing numbers of degrees, from 0 up to 360 as shown on the display. If this is not a desirable mode of operation contact Carousel USA to see if there may be a viable workaround.

iv. Turntable Not Spinning via CUSA360 Commands

Recheck the ethernet connections from your network to the PLC for loose connections or damaged cabling. Ensure the same IP Address is listed in the CUSA360 Settings page as found on the PLC with IPScanner in the IP Address Section of this chapter. Ensure your computers network adapter is using a compatible IP address by opening “Windows Settings” => “Network and Internet” => “Ethernet” => “Change Adapter Options” => Right-Click the ethernet connection you are using and select “Properties” => Select “Internet Protocol Version 4 (TCP/IPv4)” and “Properties” => If it isn’t already, set the IP address to something on the same network as the PLC (i.e. if the PLC is 192.168.1.100 yours must be 192.168.1.xxx where xxx is any number between 1 and 255 that is not 100).

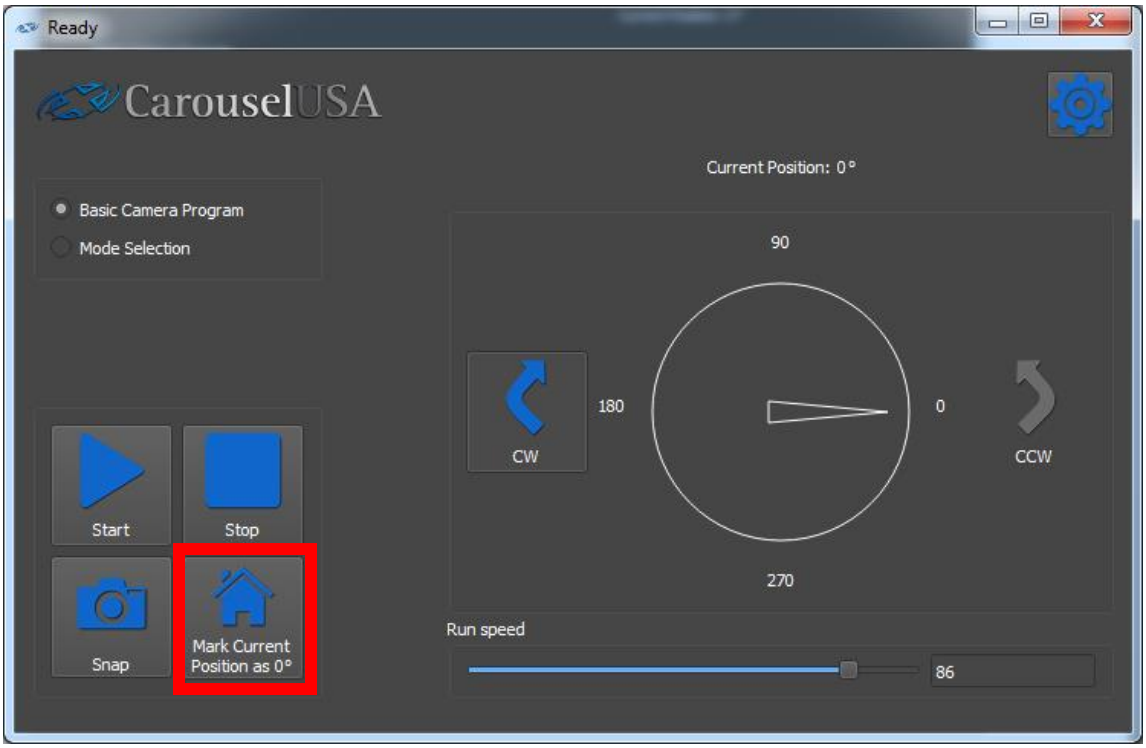
v. Turntable Spins Opposite Direction Than Instructed

The software may display a value that differs from the memory. Clicking CW then back to CCW will often fix the issue.

If the problem persists, while using the Latch commands instruct the table to begin motion, then toggle the direction while in motion. If the table indeed slows down and begins spinning the opposite direction, please contact Carousel USA for further support.

vi. CUSA360 Rotation Degree Does Not Reflect Physical Table Rotation Degree

Rotate the turntable until the physical rotation degree is in the "zero position" you require. Then, on CUSA360 hit the button labeled "Mark Current Position as 0°" and the software graphic will change to reflect the physical position of the turntable.



vii. Connection is Lost

If the connection is lost after a power cycle, the IP address may have changed. If this proves problematic, hire an IT professional to set your DHCP server to recognize the MAC Address of the PLC and establish a consistent IP for the device.

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(626)334-7190

viii. Camera Not Working

Try using a third-party shutter release cable to ensure the settings are correct for your camera. Note that the title of CUSA360 says "Ready" and not "Disconnected", be sure that you can operate the table properly. If the table doesn't move, fix that problem first. Some camera manufacturers may require the camera to be in a specific mode (Try the Manual mode) to use the external shutter release feature. Be sure that the CUSA360 software is working to control the turntable before troubleshooting the camera connectivity.

ix. Camera Automatically Focusing

The shutter release command also closes a contact that instructs the camera to focus prior to taking a photo. If you don't wish for this to occur, there will typically be features or settings on your camera you can set to disable the autofocus.

x. Camera Not Taking All Photos

The camera shutter release cycle takes 1/2 second (500ms), if the table is spinning too quickly there may not be enough time to capture the photo in the exact position and the system will simply trigger as soon as it's finished with the previous photo. Try slowing the table speed down or reducing the number of photos.

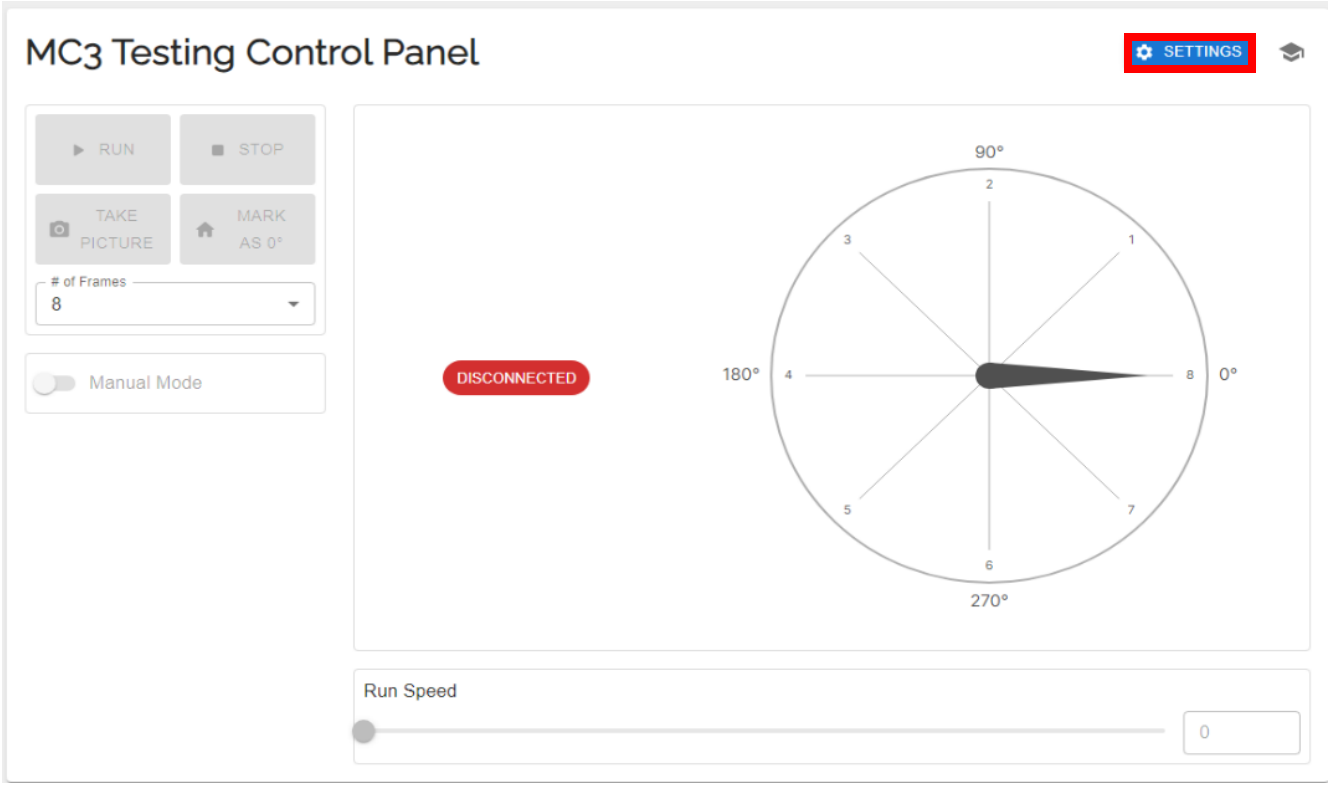
12. Carousel-USA Web App

A. Creating A New Account

Contact Carousel-USA if you wish to create a new Carousel-USA Web App Account to control your MC-3. Provide your email address and your desired password and Carousel-USA will respond with your activated account information. If requested, you can be given a company admin account, allowing you to add specific locations and allow access to other users in your company with their own Carousel-USA account.

B. Connecting to Your Turntable

After logging into the Carousel-USA Web App, go into the "Settings" page, ensure the IP address is accurate, and copy the License Key. Then, hit Download MC3 Controller App and open the file when its downloaded (NOTE: While downloading, you may experience warnings about downloading files from an unknown publisher, you must hit the keep anyway button to continue the installation). Once running, you must hit the edit icon next to "CarouselUSA License Key", paste the License Key copied previously, and save it. You will then be connected, and the controller app can be minimized **(DO NOT EXIT THE CONTROLLER APP WINDOW AS IT MUST BE RUNNING FOR THE WEB APP TO MAINTAIN A CONSISTENT CONNECTION TO THE PLC)**.



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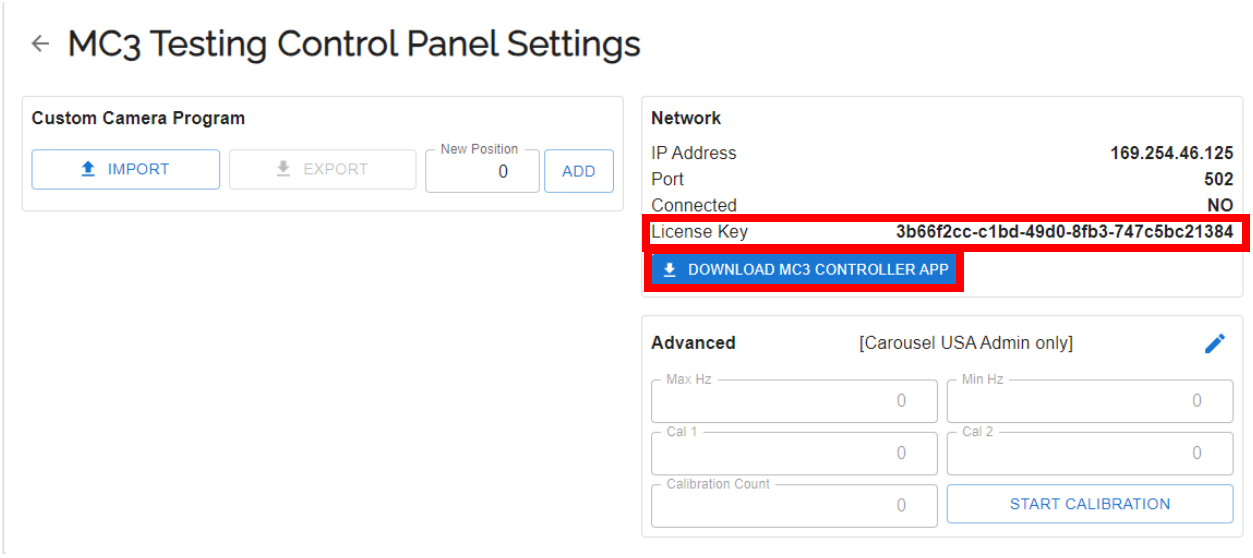
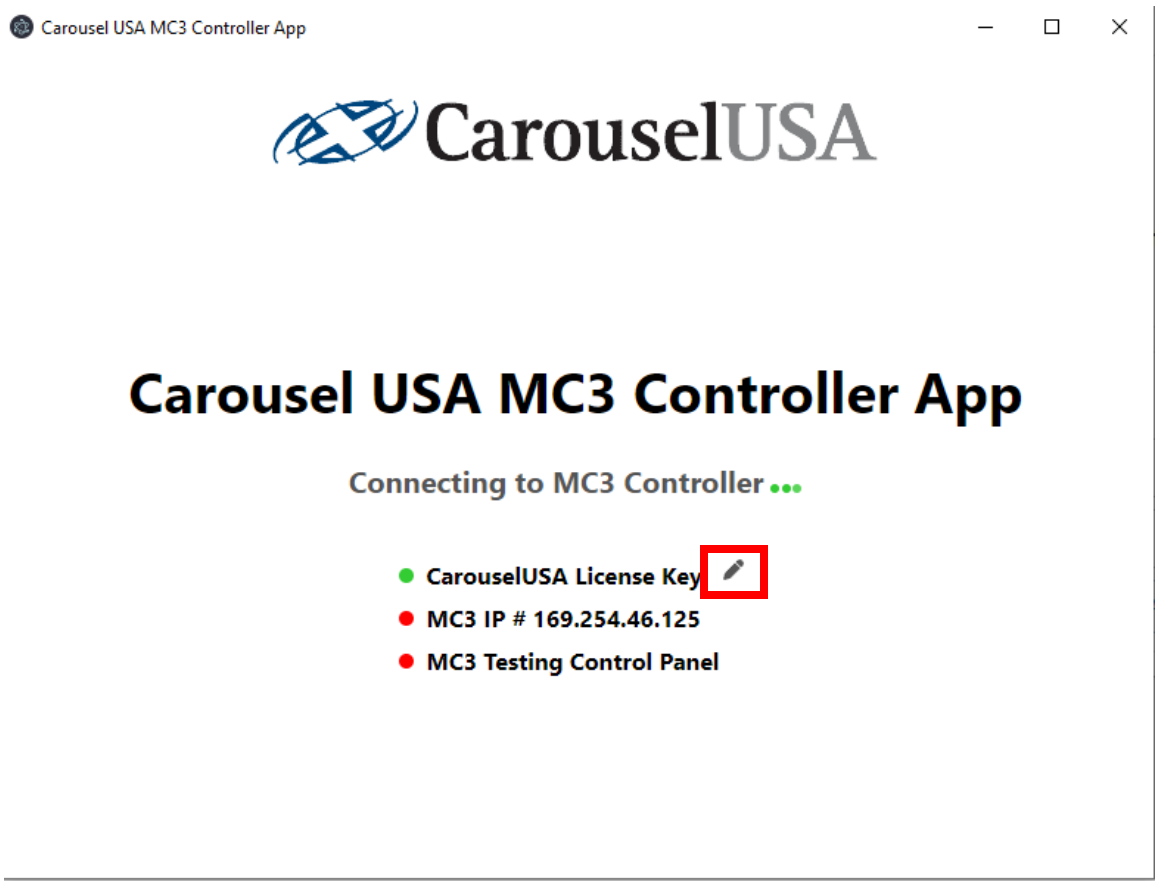
(626)334-7190


MC3 Testing Control Panel Settings
Custom Camera Program
IMPORT
EXPORT
New Position
0
ADD
Network
IP Address
169.254.46.125
Port
502
Connected
NO
License Key
3b66f2cc-c1bd-49d0-8fb3-747c5bc21384
DOWNLOAD MC3 CONTROLLER APP
Advanced
[Carousel USA Admin only]
Max Hz
0
Min Hz
0
Cal 1
0
Cal 2
0
Calibration Count
0
START CALIBRATION


Carousel USA MC3 Controller App
CarouselUSA
Carousel USA MC3 Controller App
Connecting to MC3 Controller ...
CarouselUSA License Key
MC3 IP # 169.254.46.125
MC3 Testing Control Panel

C. *Connecting to Another Turntable*

If you have multiple MC3 Turntables, you can choose which one you want to control by editing the license key in the connection window to match the license key of the turntable you wish to control (displayed on that turntables settings page).

D. *Checking IP Addresses*

Many connection issues stem back to a mismatch in IP Address at some point in the control chain. Here we will see how to check the IP Address of each point to ensure good communication throughout the whole process.

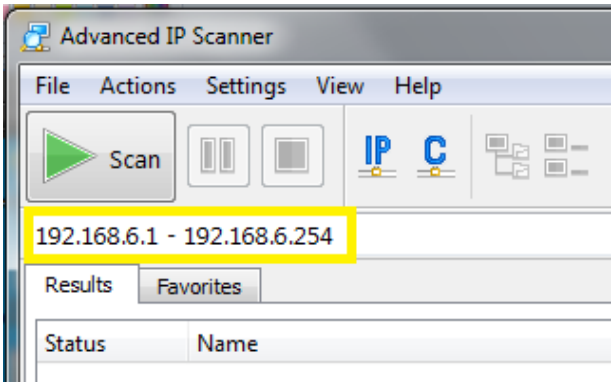
i. PLC IP Address

With most networks the PLC will assign itself an IP address automatically upon connection. The IP can change if there is a power loss or other server interruptions.

A third-party IT professional can set up the network to consistently assign an IP address to the PLC to help reduce the need for the following steps in the future.

To get the IP address, you will need to install the Advanced IP Scanner v2 software. The software can either be downloaded at the following address, by Googling IP Scanning software or it is located on the included USB drive. Here is the link to the software: http://www.advanced-ip-scanner.com/download.php?lng=en

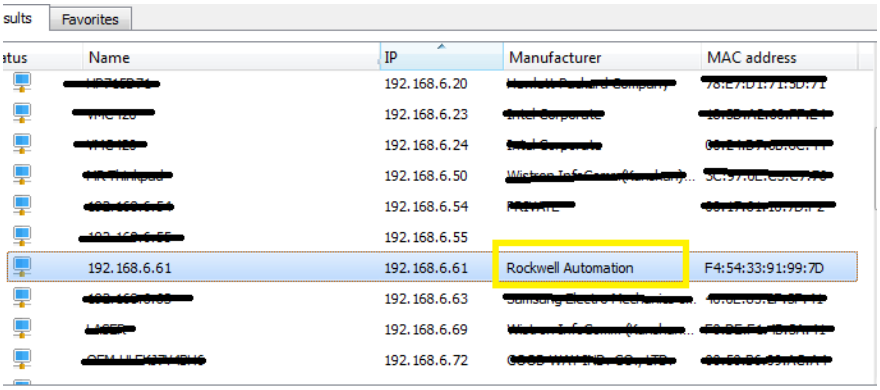
Once the Advanced IP Scanner is installed and opened, you will see the window shown below. In the highlighted yellow box, type a search range with a range from your gateway (Shown as 192.168.6.1) to a 254 in the last box.



So, for example, if your Gateway was 192.168.1.1 then your search box would read 192.168.1.1-192.168.1.254. Or, if your gateway was 72.3.156.1 then your search box should read 72.3.156.1-72.3.156.254. If you do not know your gateway, please contact your IT Administrator.

If you don't insert a range, you will not be able to do a search. If you scan every possible IP address from 1.1.1.1 to 255.255.255.255 then this process will take a very long time while you wait for thousands of possible addresses to be tested. But as long as you start at your gateway, this should search your local network. Hit Enter to perform the search.

Scroll down the list till you see a device listed with a listed Manufacturer of **Rockwell Automation**. The **IP address** listed to the left of the Manufacturer is the IP address of the Carousel USA MC-3 motion control box. Write this value into the IP address field of the first step. The line you are looking for will look like this:

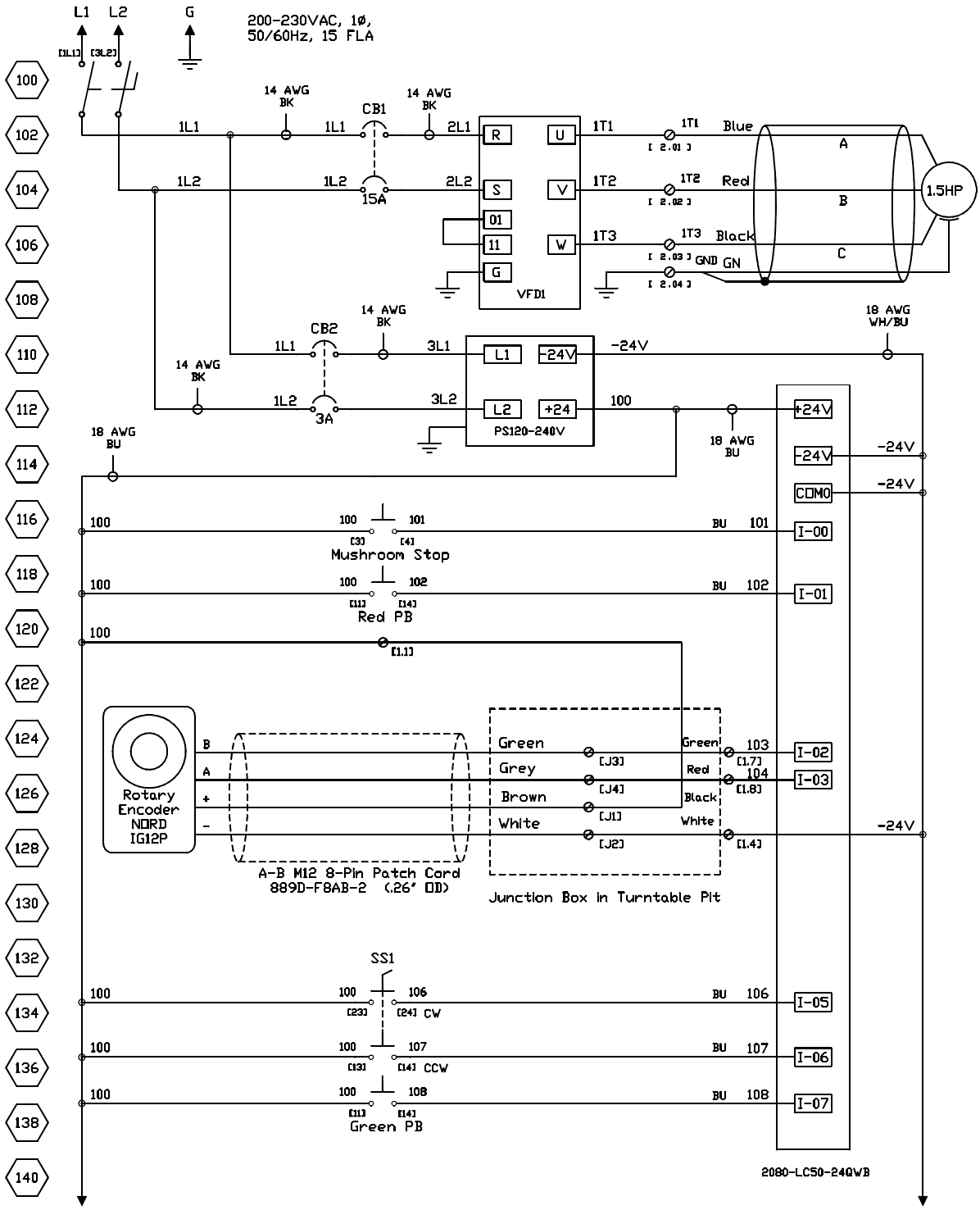


ii. Check for Match in Web App

Ensure the IP Address found in the last step matches the IP address listed in the settings page for your turntable in the Web App. If there is a mismatch, call Carousel-USA at (626)334-7190 and ask for electrical troubleshooting assistance.

iii. Ethernet Adapter IP

Ensure your computers network adapter is using a compatible IP address by opening "Windows Settings" => "Network and Internet" => "Ethernet" => "Change Adapter Options" => Right-Click the ethernet connection you are using and select "Properties" => Select "Internet Protocol Version 4 (TCP/IPv4)" and "Properties" => If it isn't already, set the IP address to something on the same network as the PLC (i.e. if the PLC is 192.168.1.100 yours must be 192.168.1.xxx where xxx is any number between 1 and 255 that is not 100).



Disconnect:
ABB OT16F3

Circuit Breaker 1:
Weidmuller BR2D15UC

Circuit Breaker 2:
Weidmuller BR2D3UC

VFD:
Powerflex 4M
Allen-Bradley 22F-A8P0N103
IN:
208-240VAC/1Ø/50-60Hz
OUT:
8.0A@230VAC/3Ø/6-120Hz

See Parameters,
Page 2, line 232

Motor:
Nord 1.5 HP, 3Ø, 230VAC,
60Hz, 4.2A
4 Pole 1740 RPM

Power Supply:
Allen-Bradley 2080-PS120-240VAC
IN:
120/240VAC/1Ø/50-60Hz
OUT:
24VDC 1.6A

Mushroom Stop Switch
Allen-Bradley 800FP-MT44

PB Red
IDEC LB1L-M1T54R

Rotary Encoder
On Motor Shaft
Nord Type IG12P
P/N: 19551501
HTL/Push-Pull (IC-WE)
10-30VDC 1024PPR
M12 8 Pin Connector
Pin 1: 0V
Pin 2: +V
Pin 3: A
Pin 4: A\
Pin 5: B
Pin 6: B\
Pin 7: Z
Pin 8: Z\\\

Junction Box
Lite Cycle SKU:
SG-TB-10PT-GS

3 Position Selector Switch
Allen-Bradley 800FD-SB32X2

PB Green
IDEC LB1L-M1T54G

PLC:
Allen-Bradley Micro 850
PLC 2080-LC50-24QWB

TOLERANCE BLOCK:
DECIMALS: X.X ± .050, X.XX ± .020, X.XXX ± .010
ANGULAR: ± 1°
DIMENSIONS ARE IN INCHES

MATERIALS USED: N/A

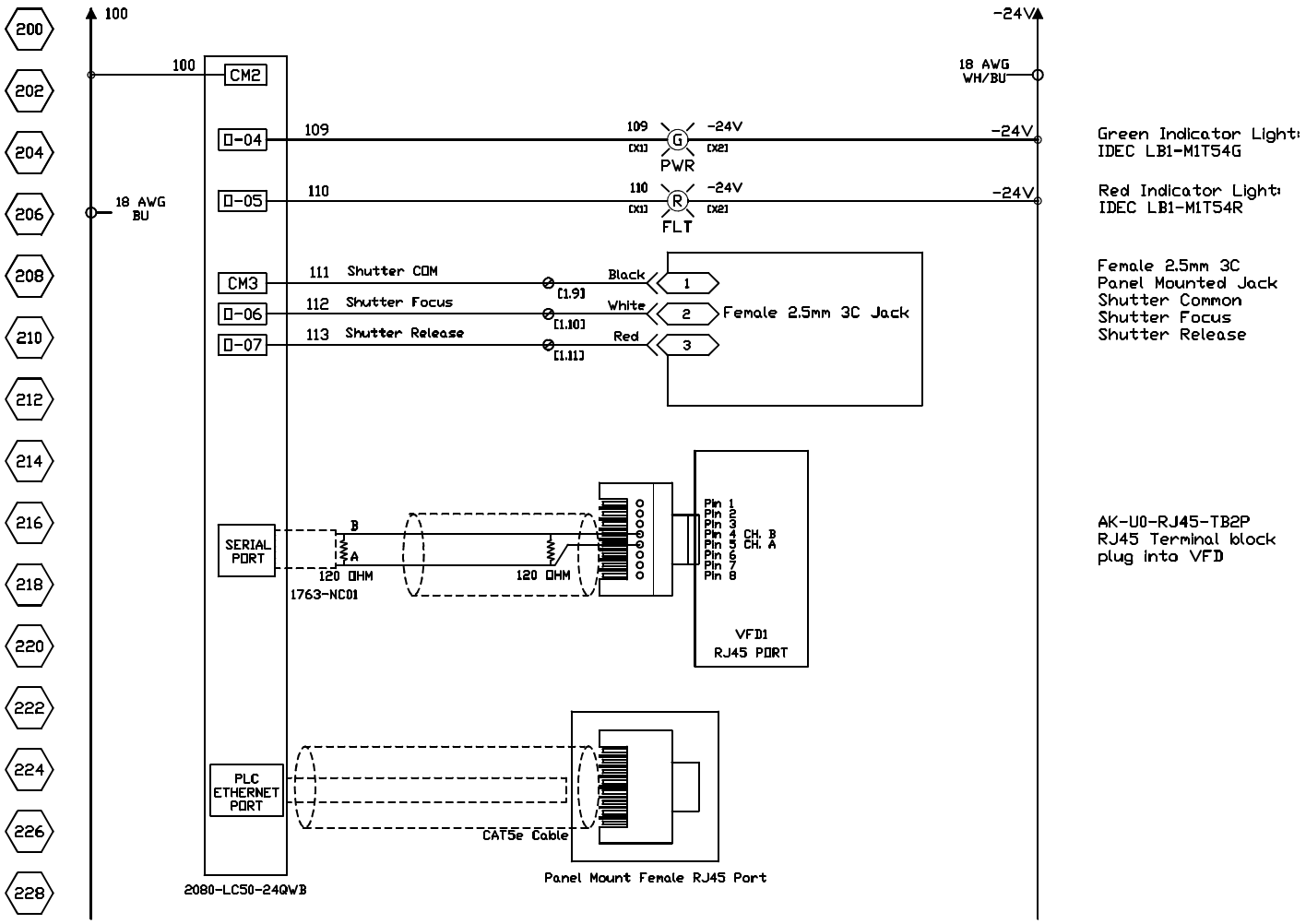
REVISION DATE: 9/9/21

APPROVALS | DATE
DESIGNED BY:
ENG. APPROVAL:
MFG. APPROVAL:

Carousel USA

TITLE OR DESCRIPTION:
MC3 Schematic
With Micro 850 PLC

SIZE	AUTOCAD FILE:	DRAWING NUMBER:	REV
A	C13001	C13001	B



For field wiring use Copper
or Aluminum Conductors rated
for 60°C (140°F)
Terminal torque 7lb.in.

VFD Parameters:
(Following must be changed by Installer)
Jumper on "Source"

Powerflex 4M

P103:	4.2	[A]	(Motor OL Current)
P104:	15.0	[Hz]	(Minimum Frequency)
P105:	60	[Hz]	(Maximum Frequency)
P106:	5	[Comm]	(Start Source)
P107:	0	[Coast]	(Stop Mode)
P108:	5	[Comm]	(Speed Ref)
P109:	3.0	[Sec]	(Acceleration Time)
P110:	2.5	[Sec]	(Deceleration Time)
C302:	3	[9600]	(Comm Data Rate)
C303:	100	[Addr]	(Comm Node Addr)
C306:	0	[8-N-1]	(Comm Format)

TOLERANCE BLOCK:
DECIMALS: X.X ± .050, X.XX ± .020, X.XXX ± .010
ANGULAR: ± 1°
DIMENSIONS ARE IN INCHES

MATERIALS USED: N/A

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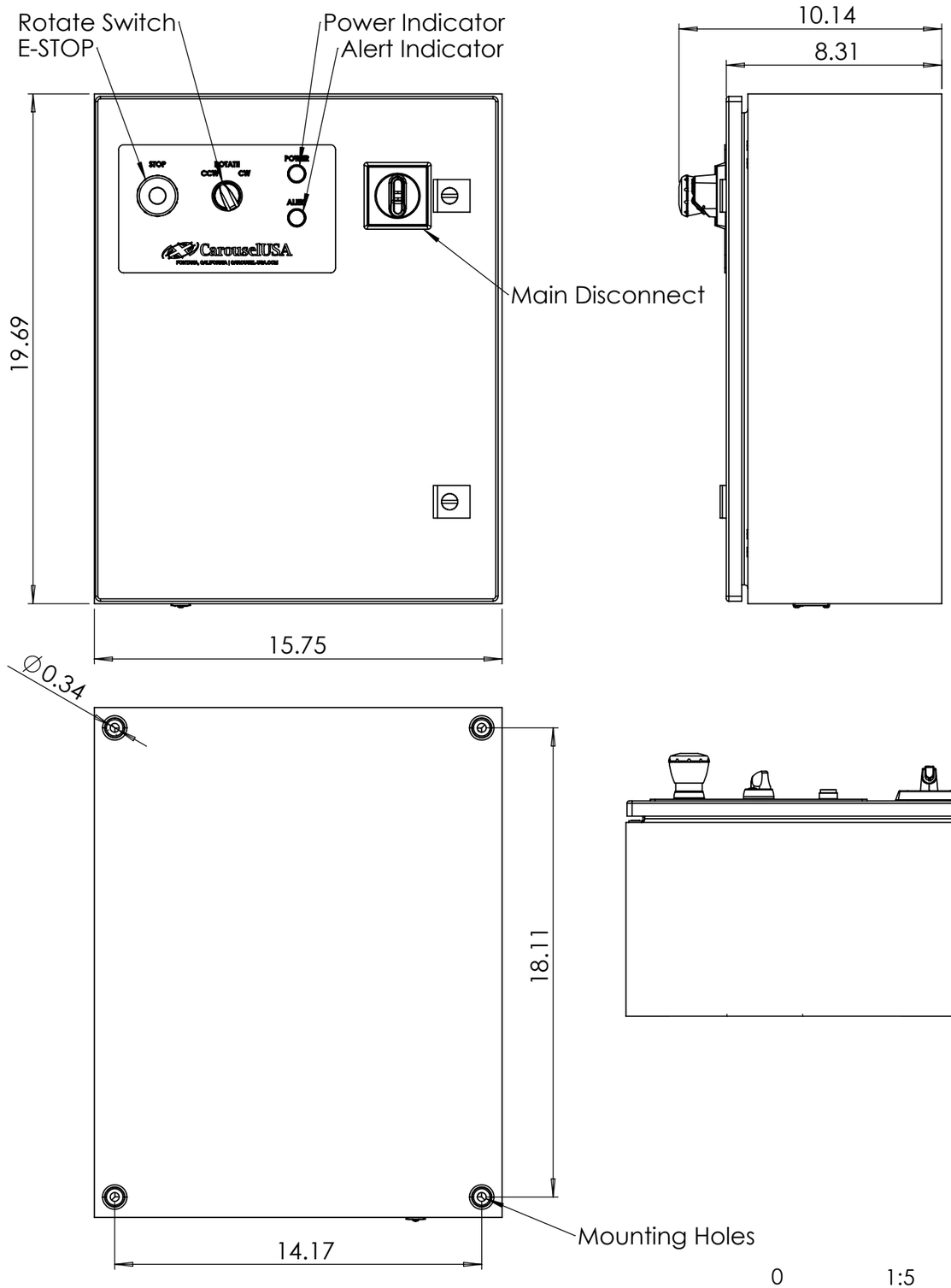

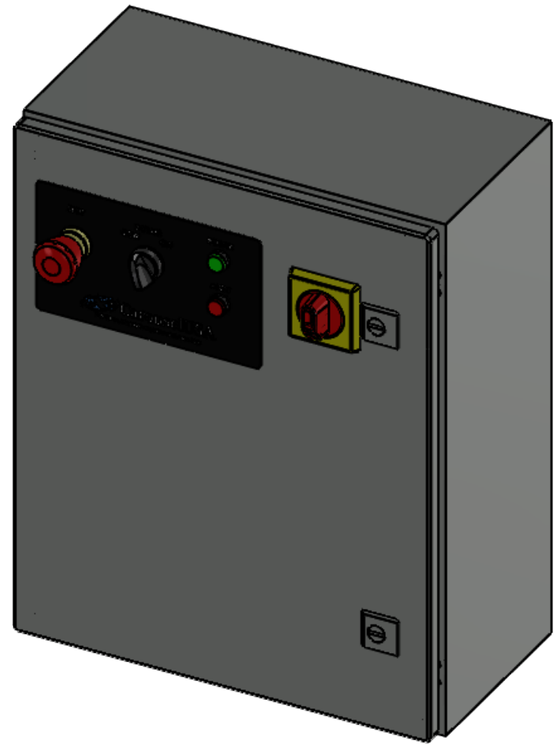

DESIGN BY:		3/30/2022
DRAWN BY:		3/30/2022

CarouselUSA

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES

TOLERANCES

.X = ± .125
.XX = ± .0625
.XXX = ± .010

FRACTIONAL = ±1/16"

ANGLES = ± .5

TITLE:

MC3 CONTROL PANEL
General Dimensions

CAROUSEL USA
15206 Ceres Avenue
Fontana, CA 92335
TEL: (626) 334-7190
FAX: (626) 236-4060
www.Carousel-USA.com

SIZE	DWG. NO.	REV
B	M13001	B

SCALE: 1:5 | DO NOT SCALE DRAWING | SHEET 1 OF 1